

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN OR RELATING TO WINDOW OPERATING MECHANISMS FOR MOTOR VEHICLE WINDOWS

(71) We, LAMES S.P.A., an Italian joint stock company, of Via S. Rufino 29, Chiavari, Genoa, Italy, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 The present invention relates to window-operating mechanisms for motor vehicle windows.

Known window-operating mechanisms generally consist of a plurality of independent parts which must be fitted separately to the door of the vehicle upon assembly. Production of the various parts of such mechanisms, and the assembly and fitting of these to a vehicle, is both time consuming, laborious and costly, particularly because of inevitable adjustments which must be made after fitting in order to ensure that the various different parts are accurately positioned for correct interaction.

25 According to the present invention there is provided a window-operating mechanism for a motor vehicle window, the different parts of which mechanism are connected together as a unit which is mountable directly onto a door; said mechanism comprising a rectilinear rigid guide on which is mounted movably a slide which includes means for attachment thereof to the lower edge of the window, the position of the slide along the guide being determined by adjustment of a transmission cord passing over two idler pulleys supported on supports at the ends of the guide, and control means for selectively moving the cord in either direction over the pulleys and mechanically connected to the supports of the said two pulleys by means of flexible sheaths within which the cord is guided so as to form, in use, a triangle one side of which is formed by the said rigid guide and the other two sides of which are formed

by the two flexible sheaths which meet at an apex formed by the said control means, the flexibility of the sheaths permitting relative movement of the control means with respect to the rigid guide to fit the unit to a door upon mounting thereon.

50 The invention therefore enables a window-operating mechanism which is of very simple and strong construction and which moreover can be readily fitted quickly to a vehicle door without requiring any adjustment after fitting to be provided.

55 The mechanism is particularly applicable to operating windows having an irregular shape which does not permit them to be guided over the whole length of two upright opposed edges. In such a case the rigid guide is mounted to extend parallel to the direction of movement of the window which direction is parallel to one of the upright edges of the window.

60 The term "cord" will be understood herein to refer to any suitable flexible elongate inextensible elements including wires, and cable as well as non-metallic elements.

65 In order that the invention may be well understood, an embodiment thereof, given by way of example only will now be described with reference to the accompanying drawings, in which:

70 Figure 1 is a diagrammatic side view of a window-operating mechanism in position on the door of a motor vehicle;

75 Figure 2 is a side view, on an enlarged scale, of the mechanism;

80 Figures 3, 4, 5 are three partial sectional views, each on an enlarged scale, taken respectively on the lines III-III, IV-IV, V-V of Figure 2;

85 Figure 6 is a partial sectional view on an enlarged scale, taken on the line VI-VI of Figure 2;

90 Figure 7 is a partial sectional view on an enlarged scale, taken on the line VII-VII of Figure 2;

Figure 8 is a plan view, on an enlarged scale, of a detail of the mechanism;

5 Figure 9 is a perspective view of a part of the fixed main guide and of the movable slide carried thereon, of the mechanism; and

10 Figure 10 is an exploded perspective view of a detail of Figure 9.

15 Referring now to Figure 1, there is shown a door 1 of a motor vehicle having a window opening 2 within which is a movable glass window pane 3; the frame of the window opening 2, surrounding the window pane in the closed position, is shaped so that the two opposite uprights 4a, 5a are not parallel to one another. The pane 3 is slidable along two guides 4, 5 and in order for these guides to be parallel along the path of movement of the window pane, the rear guide 5 is inclined 20 at an obtuse angle with the upright 5a.

To the lower edge of the window pane 3 there is attached a mounting bracket 6 having a U-section in which the lower edge of the window pane 3 is lodged. The bracket 6 has a lower projection 6a which projects downwardly therefrom and which is connected to a slide 7 which is movable along a fixed, upright, guide 8, which is substantially parallel to the two parallel guides 4, 5. The fixed guide 8 has a hat section (J-shaped) the opposite flanges of which act as guideways for the movable slide 7, which latter is formed from a single plate having two recessed portions 9 in which there are apertures 10 for fixing the slide 7 to the lower projection 6a of the bracket 6 on which the movable window pane 3 is carried. The single plate forming the slide 7 also has both at the top and the bottom, two square-folded tabs 11 each of which has a recess 12 into which is force fitted a moulded plastics slide runner 13 having a vertical fissure 14 which engages one of the flanges of the hat section guide 8. The slide runners 13 are formed of low-friction material, and as they are relatively widely spaced from each other the slide 7 has a high resistance to rocking displacements; the window pane 3 carried thereby is thus likewise held for sliding movement but held against rocking movement in the plane of the glass.

55 On the upper end of the fixed guide 8 there is a shaped bracket 15 which carries welded thereto two threaded nuts 16 by means of which the upper end of the guide can be attached to a door. The bracket 15 extends laterally with respect to the guide and carries a projecting pivot 17 on which is mounted an idler pulley 18, the bracket thereby forming a support for the pulley 18. At the end of the projecting part of the bracket 15 there is a folded tab 19 (Figure 3) into which engages the end of a cable sheath

25 as will be described in greater detail below. 65

The lower end of the fixed guide 8 carries a further moulded bracket 20 having a flange on which is attached a threaded nut 21 for use in fixing the lower end of the guide 8 to a door; the lower bracket 20 has a projecting pivot 22 on which is mounted a second idler pulley 23, the bracket 20 thereby forming a support for the pulley 23. The end of the projecting part of the bracket 20 has a square-folded tab 24. 70

75 The projecting pivots of the two brackets 15 and 20 mentioned above both extend from the same side of the guide 8 and to their terminal tabs 19 and 24 are fitted the ends of two flexible cable sheaths 25, 26 within which slides a flexible transmission cord 31 which constitutes the drive transmission device of the mechanism. The sheaths 25, 26 have a limited degree of flexibility. At the other ends, the two sheaths 25, 26 are connected to a control device 27 comprising a moulded plate 28, which is attachable to a door, carrying a drum 29 around which the transmission cord 31 is wound for several turns. The drum 29 is connected to a toothed wheel (not shown) which engages an operating pinion 30 which is mounted for rotation by means of a window winder handle (not shown) or, alternatively, is connected to an electric motor (not shown). Rotation of the pinion 30, whether by means of a manually operable handle or by means of an electric motor, causes rotation of the drum 29 and thus longitudinal movement of the cord 31. 80

90 The arrangement of the control mechanism 27, the two sheaths 25 and 26, and the fixed guide 8 is such that the two sheaths 25, 26, and the guide 8, form the three sides of a triangle. The two sides formed by the sheaths may be deformed to vary the geometry of the device and to allow adaptation of the arrangement to individual mountings on different doors due to the limited flexibility of the sheaths. 95

100 All the parts of the mechanism can be assembled together before fitting to a door so as to form a single functional unit in which the cord 31 is suitably pretensioned for operation, so that no further adjustments are required after mounting the mechanism on a door. 105

110 The two ends 31a and 31b of the cord 31 are fixed to the movable slide 7 by means of a plate 34 which has a C-shaped section and is knurled on the inner parts thereof. The plate 34 is attached by a bolt or screw 35 to a block 36 which is attached to the slide itself. Locking of this one bolt or screw 35 thus clamps both ends of the cord 31 under the desired tension to which it is stressed during 115

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tightening of the bolt or screw 35; no further adjustment of the tension is thus required.

5 The flexible sheaths 25 and 26 are both provided, as shown in Figure 8 which illustrates one end of the sheath 25, with bushes 32 for rapid connection of the end of the sheath to the tabs 19, 24 of the brackets 15, 20 of the fixed guide and to corresponding tabs on the control mechanism 27, and with locking collars 33 for locking the bushes 32 on to the sheaths 25, 26.

10 From the above it will be apparent that fitting the window-operating mechanism described is substantially simplified since all the component parts are assembled together as a unit prior to attachment of the unit to the door of a vehicle.

WHAT WE CLAIM IS:—

20 1. A window-operating mechanism for a motor vehicle window, the different parts of which mechanism are connected together as a unit which is mountable directly onto a door; said mechanism comprising a rectilinear rigid guide on which is mounted movably a slide which includes means for attachment thereof to the lower edge of the window, the position of the slide along the guide being determined by adjustment of a transmission cord passing over two idler pulleys supported on supports at the ends of the guide, and control means for selectively moving the cord in either direction over the pulleys and mechanically connected to the supports of the said two pulleys by means of

flexible sheaths within which the cord is guided so as to form, in use, a triangle one side of which is formed by the said rigid guide and the other two sides of which are formed by the two flexible sheaths which meet at an apex formed by the said control means, the flexibility of the sheaths permitting relating movement of the control means with respect to the rigid guide to fit the unit to a door upon mounting thereon.

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2. A window-operating mechanism as claimed in claim 1 in which the rigid guide is formed by an elongate member having a hat (J-) section on the two flanges of which engage slide shoes carried by folded tabs of the movable slide.

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3. A window-operating mechanism as claimed in Claim 1 or Claim 2 in which the ends of the cord are both held together by a clamping device on the said slide, the clamping device comprising a plate with a C-shape cross section which is held by a clamping screw to a clamping block carried by the slide, the two ends of the cord being clamped between the clamping block and the clamping plate by the said clamping screw.

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4. A window-operating mechanism substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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Sheet 1

FIG. 1

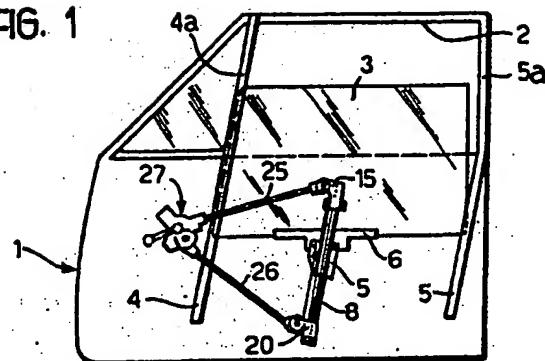


FIG. 9

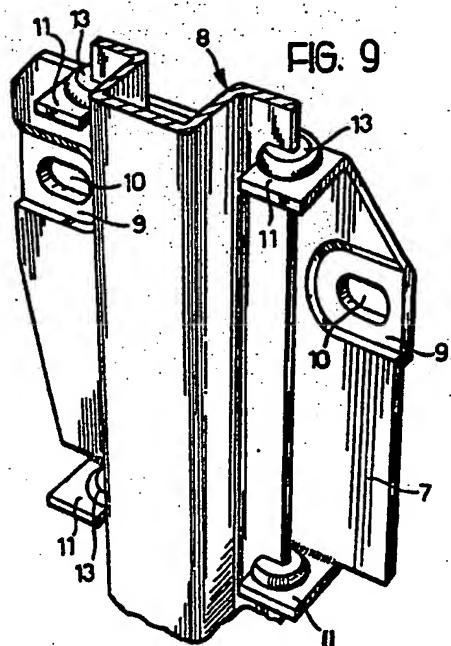
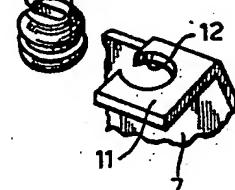


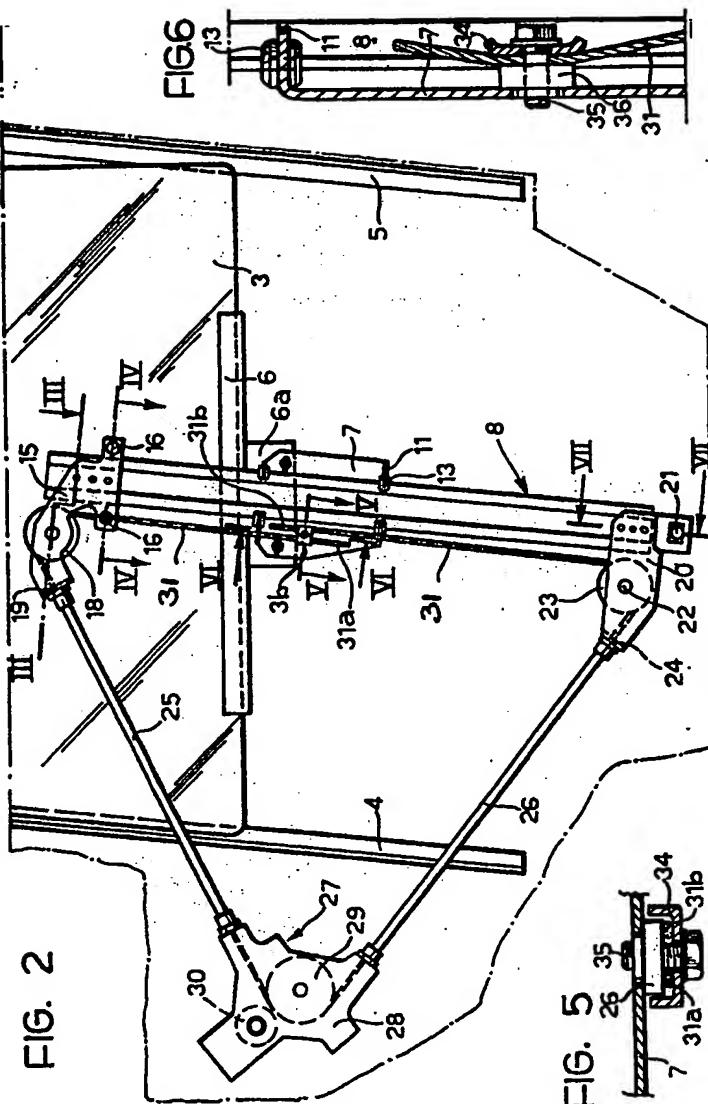
FIG. 10



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Sheet 2



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Sheet 3

FIG. 3

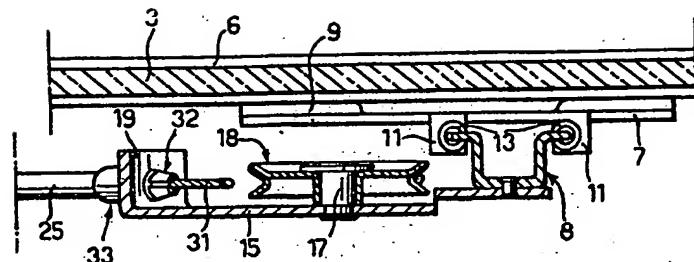


FIG. 4

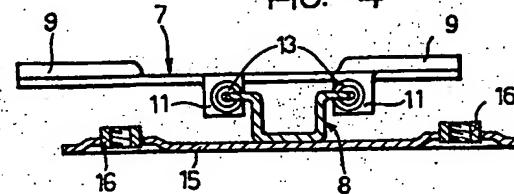


FIG. 7

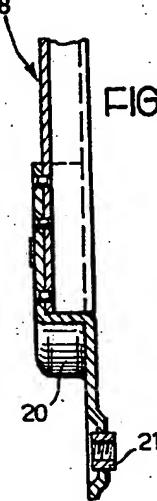


FIG. 8

